

In view of the numerous claim objections and rejections under Secs. 102, 103 and 112, all original claims have been cancelled and new claims 14 - 22 have been added which are believed to address and overcome all issues raised in the Official Action. No additional claim fees are necessary.

New independent claim 14 is directed to a combination coupling and brake assembly in which a spring actuated electromagnetically releasable brake and elastic connection are contained in a single housing. The output coupling has axially spaced engagement surfaces for contacting closely spaced radially extending end faces of a power input shaft and a power output shaft. The elastic connection compensates for axial, radial and angular misalignment of the input and output shafts. This combination of features results in a compact design which is highly beneficial for retrofit of the brake onto existing drive shafts and is not disclosed or suggested in the prior art.

Gustin et al discloses a spring actuated, electromagnetically released brake in which input shaft 50 includes a slotted female coupling 175 for reception of a key 166 on motor shaft 86. No compensation for radial or angular misalignment of the shafts is provided. The Examiner has indicated that element 140 is part of an elastic coupling similar to that of the present invention but element 140 is actually part of a coil retainer bobbin assembly 134, not an elastic connection for rotating shafts, as indicated at Col. 6 beginning at line 52. In any event, Gustin et al does not show an output coupling having axially spaced engagement surfaces for contacting closely spaced

radially extending end faces of a power input shaft and a power output shaft and with an input coupling including a clamp ring having a diameter sufficiently small to be received in an input shaft opening in the housing.

Handke pertains to a hydroviscous torque transmitting unit 10 in the form of a multiple disk clutch or brake that is electromagnetically operable. There is no disclosure of an output coupling having axially spaced engagement surfaces for contacting closely spaced radially extending end faces of a power input shaft and a power output shaft and with an input coupling which includes a clamp ring having a diameter sufficiently small to be received in an input shaft opening in the housing as in the presently claimed invention.

Mabee discloses a current operated multiple disk clutch for coupling two rotating shafts. When powered, the friction disks engage and the two shafts are coupled. Fig. 1 shows the uncoupled and Fig. 2 shows the coupled positions. Figs. 7 and 8 also show a multiple disk brake which is activated electromagnetically. The disclosed arrangements include bearings rather than an elastic connection. There is no disclosure of an output coupling having axially spaced engagement surfaces for contacting closely spaced radially extending end faces of a power input shaft and a power output shaft and with an input coupling including a clamp ring having a diameter sufficiently small to be received in an input shaft opening in the housing. In the present invention, due to the elastic connection in the housing, no additional bearings are required.

Baer is merely cited as an example of a clutch and coupling unit having a

torsionally yieldable star member 33 in which relative shaft rotation is used to automatically release the clutch when a torque overload is exerted on the shafts. This reference does not show an output coupling having axially spaced engagement surfaces for contacting closely spaced radially extending end faces of a power input shaft and a power output shaft and with an input coupling including a clamp ring having a diameter sufficiently small to be received in an input shaft opening in the housing.

Attached for the Examiner's review is a copy of the allowed claims of the assignee's parallel European Patent which are believed to be of generally commensurate scope with the claims presented herewith. Favorable consideration and early allowance in view of the amended claims and above remarks is respectfully requested.

Respectfully submitted,



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(54) **Antriebs-Abtriebs-Aggregat mit Kupplungsbremsskombination**

Drive-Driven-Unit with coupling/brake combination

Dispositif mené/menant avec combinaison accouplement/frein

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Anmerkung: Innerhalb von neun Monaten nach Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents im Europäischen Patentblatt kann jedermann nach Maßgabe der Ausführungsordnung beim Europäischen Patentamt gegen dieses Patent Einspruch einlegen. Der Einspruch gilt erst als eingelegt, wenn die Einspruchsgebühr entrichtet worden ist. (Art. 99(1) Europäisches Patentübereinkommen).

10. Aggregat nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** für ein redundantes Bremssystem eine zweite Bremse mit Magnetspule, Ankerscheibe und Rotor in die Kupplungsbremskombination eingefügt wird.

11. Aggregat nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** an die Kupplungsbremskombination ein Anschlusskasten (47) angebracht wird, in welchem sich eine Lüftüberwachung (48) mittels eines Mikroschalters befindet, welche durch die Bewegung der Ankerscheibe (7) den Mikroschalter (48) betätigt und ein Signal gibt, ob die Bremse frei oder gebremst ist.

Claims

1. Drive input/output unit including a coupling-brake combination, said unit being designed to form a connecting member (3) between motor (2) and output member (1) and comprising an integrated quiescent-current operated spring pressure brake and a central hub (15) disposed between motor (2) and output member (1), said spring pressure brake being mounted on output member (1) and the unit being designed so that the shaft end faces of motor (2) and output member (1) are contiguous in central hub (15) to so obtain the shortest possible design length of the overall unit, with brake rotor (8) of said spring pressure brake being mounted within connecting member (3) on splines (13) of central hub (15) of the hollow shaft (16) of output member (1), and with an elastic coupling being provided for torque transfer from motor (2) to hub (15), said coupling having a diameter small enough to radially fit in the center of the brake and to place the shaft end faces as near to each other as possible.

2. Unit as in claim 1, **characterized in that** said elastic coupling is formed to be a bellows coupling (18) including a clamp ring (12).

3. Unit as in claim 2, **characterized by** an adjustment ring (23) adjustable in angular position being provided to create the possibility of releasing clamp screw (32) through radial bore (22) for replacing a defective motor in any rotational position of output-side clamp ring (12).

4. Unit as in claim 2 or 3, **characterized by** clamp ring (12) having therein a recess (groove 39) receiving a plurality of circumferentially distributed threaded pegs (38), said pegs axially fixing the bellows in place for the assembly and disassembly of the motor shaft (17) so as to keep the bellows from being squeezed and overstretched during assembly.

5. Unit as in any of claims 2 to 4, **characterized by** a gap (40) additionally provided between coil carrier housing (5) and clamp ring (12), said gap ensuring an adequate radial fixing of said bellows coupling against excessive radial displacement.

6. Unit as in claim 1, **characterized by** elastic coupling of hub (15) being designed to form a plug-in coupling (41) comprising an elastic star member (42).

7. Unit as in claim 6, **characterized by** hub (15) being designed to comprise a tensioning ring (43).

8. Unit as in any of claims 6 or 7, **characterized by** brake flange (10) being designed to receive a sealing flange (45) having therein a sealing ring to seal against tensioning ring (43) so as to protect friction liners (9) from dirt and oil.

9. Unit as in any of claims 1 to 8, **characterized by** an overload coupling (49) being associated with the elastic coupling in the form of a bellows coupling or of a plug-in coupling, said overload coupling (49) being designed to deactivate the drive via an initiator/sensor (50) upon the occurrence of overload.

10. Unit as in any one of claims 1 to 9, **characterized by** providing a redundant brake system by incorporating in the coupling-brake combination a second brake comprising a magnetic coil, an armature disc and a rotor.

11. Unit as in any one of claims 1 to 10, **characterized by** said coupling-brake combination mounting a terminal box (47) housing a status monitoring device (48) comprising a micro-switch actuated by armature disc (7) to issue a signal indicating whether the brake is engaged or disengaged.

Revendications

1. Dispositif mené/menant avec combinaison accouplement/frein, dans lequel, le dispositif est réalisé sous forme de raccord (3) entre le moteur (2) et la sortie (1), avec frein sous pression de ressort intégré actionné en courant continu et avec un moyeu central (15) entre le moteur (2) et la sortie (1), le frein sous pression de ressort est disposé sur la sortie (1) et le dispositif est réalisé de sorte que les deux plans symétriques d'arbres du moteur (2) et de la sortie (1) soient directement limitrophes dans le moyeu central (15), afin que la longueur de construction la plus courte possible de l'ensemble du dispositif soit obtenue, le rotor de frein (8) du frein sous pression de ressort repose à l'intérieur du raccord (3) sur la denture (13)